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NEOTROPICAL DORILAIDÆ (PIPUNCULIDÆ) STUDIES, PART 1 (DIPTERA)*

BY D. ELMO HARDY
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This paper deals with the new species of Neotropical Dorilaidæ in the collection of the Museum of Comparative Zoölogy, Cambridge, Massachusetts. These were kindly loaned to the writer for study by Dr. Joseph C. Bequært. The species herein described will be keyed in a monograph of the Neotropical Dorilaidæ which is being prepared.

Dorilas (Dorilas) latifrons n. sp.
(Figs. 1a-b)

This species is related to *D. flavitarsis* (Williston). The species is distinguished by the broad front and narrow face of the female, the presence of well-developed flexor spines on the femora, by having the r-m crossvein at the basal third of the discal cell and the last section of the fourth vein not sinuous.

Female. Head: Front very broad, expanded in the middle, gray on the sides and with a polished black ridge running its entire length down the middle. At its widest point the front is two times wider than the ocellar triangle. Face very narrow, at its narrowest point it is about equal, in width to one eye facet. The occiput is chiefly gray brownish on the upper portion behind the vertex. The labellum and the third antennal segment are yellow, the palpi and the first two antennal segments are brown. The third segment is acute at apex (Fig. 1a). *Thorax:* Dorsum black in ground color, sides yellow brown. Mesonotum and scutellum chiefly brown pollinose, pleura gray.

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* Published by a grant from the Museum of Comparative Zoölogy at Harvard College.

Humeri, tegulæ and halteres yellow. Propleura each with a fan of fine pale hairs. Dorso-central hairs conspicuous, marginal scutellars very short, poorly developed. *Legs:* Coxæ and femora, except for yellow apices, dark brown to black. Trochanters, tibiæ and most of tarsi yellow. Femora moderately swollen, flexor spines well developed. Tibiæ without apical spurs or spines and with no strong bristles on the swollen portion. Tarsal claws and pulvilli small, but little longer than the last subsegment of the tarsus. *Wings:* Distinctly fumose, stigma dark brown and not quite filling all of the third costal section. Third section equal in length to the fourth. The two combined are slightly longer than the fifth section. The r-m crossvein is at the basal third of the discal cell and the last section of the fourth vein is gently curved. The last section of the fifth vein is slightly longer than the m crossvein. The petiole of the cubital cell is about equal to the length of the r-m crossvein. *Abdomen:* Sides almost parallel, first three terga opaque, rather densely grayish pollinose; terga four to six subshining, rather lightly brownish dusted above, gray on the sides. First tergum with two strong hairs on each side, abdomen otherwise sparsely but conspicuously covered with short erect hairs. Hind margin of sixth tergum not excised. Venter yellowish brown. *Ovipositor:* Base subshining black, subglobose in shape and with a pair of small tubercles below. Piercer yellow, very slightly upcurved near apex, one and one-half times longer than the base and extending to about the middle of the fourth abdominal segment (Fig. 1b). *Length:* Body, 2.8 mm.; Wings, 3.0 mm.

Male unknown.

Holotype female: Whitfield Hall, Blue Mts., near 4500 ft., Jamaica, Aug. 13–20, 1934 (P. J. Darlington). Type (M.C.Z. No. 27700) returned to the Museum of Comparative Zoölogy.

Dorilas (Eudorylas) replicatus n. sp.

(Figs. 2a-b)

This species is related to *D. rex* (Curran); it is best distinguished by the yellow antennæ and the differences in the hypopygial characters. The outer harpago is two or more times longer than wide and the inner is very differently shaped than in *rex.* The processes on the sixth segment of the abdomen are also distinctive.

Male. Head: Eyes very narrowly separated on the front, nearly touching for half the length of the front. Front and face silvery gray pubescent. Mouth parts and third antennal segment bright yellow. First two antennal segments brown, ventral bristles of second as long as the segment. Third segment gently rounded below, shaped as in *D. rex* (Curran). *Thorax:* Pleura yellow brown in ground color, densely gray pollinose. Dorsum black, covered chiefly with brownish pollen. Propleura bare dorsocentral hairs very small and inconspicuous; marginal fringe of scutellum distinct but the hairs are short and fine. Humeri, tegulæ and knobs of halteres dark brown to blackish. *Legs:* Coxæ and femora chiefly dark brown, the latter with yellow bases and apices. Trochanters, tibiæ and basal subsegments of tarsi yellow; the apical subsegments blackish. All femora silver pollinose on the posterior side and with a row of fine cilia near the upper portion of the posterior side. Flexor spines present only on the basal one-third to one-half of the middle femora, absent on the other legs. Middle coxæ with a row of black bristles at apices above. Hind tibiæ without strong erect bristles on the swelling. *Wings:* Very lightly fumose, stigma brown and filling all of the third costal section. Third section slightly longer than the fourth, the two combined are slightly longer than the fifth. The r-m crossvein is located at the basal third of the discal cell and the last section of the fourth vein is strongly curved. *Abdomen:* Chiefly dark brown with broad gray fasciæ on apical halves of segments, these are broadly interrupted with brown in the middle. *Hypopygium:* Similar in general appearance to *D. rex* except that the apical membranous area is not so large (Fig. 2a). The outer harpago is two times longer than wide and over one-third as long as the inner harpago. The inner is greatly enlarged on apical half and also produced on inner side of basal portion (Fig. 2b). The sixth abdominal segment is developed on the venter into two elongate processes, the larger (first) process is trifid, with two extra teeth developed near base (Fig. 2b). The ædeagus is very complex in structure and possesses numerous points and processes. Length: Body, 4.5–5.0 mm.; female, 6.0 mm. Female unknown.

Holotype male: Canal Zone, Barro Colorado, July 13, 1924 (N. Banks). One paratype male, same locality and collector, June 20, 1924.

Type (M.C.Z. No. 27711) returned to the Museum of Comparative Zoölogy. Paratype deposited in the United States National Museum Collection.

Dorilas (Eudorylas) spinosus n. sp.
(Figs. 3a-c)

This species keys out near *D. stygius* n. sp. but is readily distinguished by the presence of apical spurs or spines on the femora and first two pairs of tibiæ, the long acuminate third antennal segment and bare propleura.

Female. Head: Front equal in width to the face. Upper third of the front shining black, lower portion grayish with a narrow median black line extending about one-half the length of the front. Face and most of occiput gray, upper portion of occiput blackish. Mouthparts and first two antennal segments brown, third segment yellow, long acuminate and covered with long pale pubescence (Fig. 3a). *Thorax:* Mesonotum chiefly polished black, lightly brownish in the middle and gray just inside the humeri. Scutellum subshining, lightly brownish pollinose. Pleura brownish in color, densely gray pollinose. Humeri, tegulæ and halteres yellow. Propleura bare, dorsocentral and scutellar hairs very small and inconspicuous. *Legs:* Yellow red in color except for brownish coxæ, apical subsegments of tarsi and slight discolorations at middles of hind femora. Femora slender, no flexor spines on hind pair. Middle femora each with eight to ten pairs of small flexor spines beneath, front femora with three pairs. All femora with a pale yellow apical spur-like process below (Fig. 3b), this fits into a grooved out portion of the tibia base when the leg is folded. Front and middle tibiæ each with a pair of strong apical spines below. All tibiæ with a strong bristle on the outer side of the swollen portion near the middle (Fig. 3b). *Wings:* Hyaline or nearly so, stigma light brown and filling most of the third costal section. Third section slightly shorter than the fourth. The two sections combined are longer than the fifth. Crossvein r-m located at the basal one-third of the discal cell, the last section of the fourth vein straight or nearly so. *Abdomen:* First and second terga chiefly grayish pollinose, remainder of dorsum polished black, lightly grayish on the sides. First tergum with one or two strong bristles on each side, remainder of abdomen with very sparse short hairs. Sixth tergum not excised on hind margin. *Ovipositor:* Base small, black and globose from a lateral view. From above the base is seen to be divided into two lobes by a median furrow extending longitudinally down the dorsum. Piercer short and straight about as long as the base in length and extending to base of fourth abdominal segment (Fig. 3c). *Length:* 3.0 mm.; wings, 4.0 mm. Male unknown.

Holotype female: Hamburg Farm, Costa Rica, April 1 (C. W. Dodge). One paratype female: Grenada, Grand Etang, Sept., 1910 (Allen and Brues). This specimen is headless.

Type (M.C.Z., No. 27701) and paratype returned to the Museum of Comparative Zoölogy.

Dorilas (Dorilas) stygius n. sp.
(Figs. 4a-c)

This species runs near *D. spinosus* n. sp. but has no apical spines on the tibiæ or femora, the third antennal segment is acute below and the propleura are haired.

Male. Head: Eyes joined for a distance slightly less than the length of the frontal triangle. Front and face gray pubescent, the former shining black on the median swelling. Occiput gray on sides and below, brown to blackish above. Labellum and third antennal segment yellow, palpi and first two antennal segments brown. Second segment with long pale bristles above and below. Third segment acute (Fig. 4a). *Thorax:* Subshining black in ground color, brownish gray pollinose on the dorsum gray on the sides. Humeri yellowish brown. Tegulæ and halteres yellow. Propleura each with a fan of hairs, dorsocentral and marginal scutellar hairs small and inconspicuous. Metanotum evenly convex, without a transverse furrow. *Legs:* Chiefly yellow, coxæ and apical subsegments of tarsi brown, femora with slight discolorations of brown in the middle. Hind trochanters with a dense patch of short yellow pile beneath. Middle coxæ with several long curved hairs at their apices above. Femora rather slender, flexor spines well developed, these are short and black on the middle and hind pairs and long, yellow and bristle like on the first pair. Tibiæ without strong erect bristles medianly. Tarsal claws and pulvilli very small, shorter than the last subsegment of the tarsus. *Wings:* Very lightly fumose, stigma pale brown and filling all of the third costal section. Crossvein r-m situated at about the basal three-sevenths of the discal cell. Last section of the fourth vein very gently curved, almost straight. Ultimate section of the fifth vein slightly shorter than the m crossvein. *Abdomen:* Chiefly polished black, first tergum entirely gray, other terga very narrowly opaque at the anterior margins. Sides of abdomen almost parallel. First tergum with three or four black bristles on each side, remainder of abdomen very sparsely haired. Sixth and seventh terga not visible from a dorsal view. *Hypopygium:* Compressed to the right, with an apical membranous area on the right side. From a dorsal view it is about three-fourths as long as the fifth abdominal segment (Fig. 4b). From a ventral view the membranous area extends to the base of the coxopodite. The coxopodite is largely black in color, the harpagones are yellow and are short, broad, densely gray pubescent and rounded at apices. *Length:* Body, 3.3 mm.; wings, 4.0 mm.

Female. Front broader than the face, shining black on the upper one-third and on frontal tubercle, remainder of front gray. Second antennal segment more yellowish than in the male. The mesonotum and scutellum are more grayish brown pollinose and the sides of the abdomen more distinctly gray than in the male. The femora are entirely yellow. The hind margin of the sixth tergum is straight, not excised. *Ovipositor:* Base reddish brown, subelongate, slightly swollen below, upper surface of base minutely gray pubescent. Piercer yellow, short and straight, about equal to the base in length and extending to about the anterior margin of the third abdominal segment (Fig. 4c). *Length:* Body, 2.6 mm.; wings, 3.3 mm.

Holotype male: Moneague, Jamaica, Jan. 28 (W. S. Brooks). Allotype female same locality and collector, Feb.

Type (M.C.Z. No. 27702) and allotype returned to the Museum of Comparative Zoölogy.

Dorilas (Eudorylas) trinidadensis n. sp.

(Figs. 5a-c)

This species appears to be most closely related to *D. lindneri* (Collin), but eyes of the male are separated on the front. The antennæ are entirely yellow and the genital characters and wing venation are very different.

Male. Head: Eyes very narrowly separated on the front, in the median portion this separation is about one-third the width of one eye facet. Narrowed portion of the front and ocellar triangle shining black, frontal triangle and face silvery gray pubescent. Occiput chiefly gray, brownish to black pollinose on upper portions. Mouthparts and antennæ entirely yellow. Bristles of second antennal segment yellowish brown and rather strong. Third segment obtuse, rounded below (Fig. 5a). Basal portion of each arista yellow. *Thorax:* Mestonotum, scutellum and metanotum black in ground color, the latter grayish pollinose the others chiefly brownish. The hind margins of mesopleura, upper halves of pteropleura and upper margins of sternopleura are yellow, the remainder of the pleura are brown. The humeri are dark yellowish brown, the tegulæ are brown and the halteres yellow except for brownish discolorations on the knobs. The propleura are bare, the dorsocentral hairs are present but weak and the marginal hairs of the scutellum are not well developed. *Legs:* Entirely yellow except for brownish coxæ and apical subsegments of tarsi. Femora slender, flexor spines absent, except on the middle pair. Tibiæ without apical spurs or spines and with no well-developed bristles on the outer sides. *Wings:* Hyaline or nearly so. Stigma brown, filling all of the third costal section. Third section equal in length to the fourth. The fifth section is about equal in length to the third and fourth combined. The r-m crossvein is situated near the basal fifth of the discal cell and the last section of the fourth vein (M1 + 2) is very slightly curved. *Abdomen:* Subshining black, rather lightly brown pollinose on the dorsum and gray on the sides. The side spots of the fifth tergum extend rather conspicuously onto the dorsum, the interruption between the two spots is equal to about one-third the width of the abdomen. The sides of the abdomen are almost parallel. The first tergum has a row of six to eight short dark bristles on each side, the remainder of the abdomen is rather conspicuously covered with short erect hairs. *Hypopygium:* Almost equal in length to the fifth abdominal segment and with a very large apical membranous area (Fig. 5b). The sixth and seventh terga are plainly well developed, visible from a dorsal view. From a lateral view the seventh tergum is wider than that portion of the eighth segment visible from the side (Fig. 5c). The eighth segment is dark brownish black, lightly grayish brown pollinose. The coxopodite is brownish red at the base and yellowish on apical portion. The harpagones are yellowish red in color, are rather slender and each harpago is pointed on the inner apex (Fig. 5c). *Length:* Body, 4.0 mm.; wings, 5.7 mm. Female unknown.

Holotype male: Port of Spain, Trinidad, July (W. S. Brooks).

Type (M.C.Z. No 27703) returned to the Museum of Comparative Zoölogy.

Cephalosphæra panamænsis n. sp.

(Figs. 6a-d)

This species is related to *C. elegantula* (Williston), it is distinguished by the short acuminate, yellow third antennal segment; the opaque abdomen and the all yellow femora.

Male. Head: Eyes joined on the front for a distance slightly greater than the length of the frontal triangle. Front and face silvery pubescent, occiput chiefly gray, lightly brownish above. Mouthparts and antennæ bright yellow, first two antennal segments slightly discolored with brown. Basal portion of the aristæ yellow. Second antennal segment with one long and two or more shorter bristles below. Third segment moderately pointed but not long acuminate below (Fig. 6b), rather densely covered with yellow pubescence. *Thorax:* Mesonotum black in ground color densely brown pollinose except for gray anterior corners. Posterior calli, scutellum and pleura brownish yellow in ground color, the scutellum is brownish dusted and the pleura gray. The humeri are bright yellow in color, the tegulæ are yellow brown. The halteres are chiefly pale yellow with the knobs slightly discolored. The propleura each have a fan of yellow hairs, the dorsocentral hairs are present although weak and the scutellum has a row of moderately developed hairs on its hind margin. *Legs:* Coxæ and apical subsegments of tarsi brown, legs otherwise yellow. Femora stout, flexor spines well developed. Tibiæ without strong apical spines or spurs and with no unusually strong bristles on the outer side of the swollen portion. *Wings:* lightly brownish fumose, stigma brown and occupying all of the third costal section. Third section two times longer than the fourth and equal in length to the fifth costal section. Crossvein r-m situated at the basal third of the discal cell. The appendix on the fourth vein (M1 + 2) is one and one-half times longer than the r-m crossvein and extends nearly half way to the wing margin. The last section of the fourth vein (beyond the fork of M1 and 2) is one and two-thirds longer than the penultimate section. The last section of the fifth vein is equal to the m crossvein in length. The petiole of the cubital cell is one and one-half times longer than the r-m crossvein. *Abdomen:* Chiefly brown pollinose, very faintly subshining. First tergum entirely gray. Terga two to four gray only on the sides. Fifth tergum with a large silvery gray spot on each side occupying posterior half of segment, these are rather narrowly separated in the middle. First tergum with four or more strong black bristles on each side. Abdomen otherwise very sparsely haired. *Hypopygium:* Asymmetrical, developed toward the right side and with an elongate membranous area at the apex (Fig. 6d). The hypopygium, from dorsal view is about equal to slightly longer than the fifth abdominal segment. The seventh tergum is poorly developed, scarcely visible from a dorsal view. The eighth tergum is brown in color, the coxopodite and harpagones are yellow brown. The harpagones are short and broad and appear to be blunt at apices. *Length:* Body, 5.2–5.5 mm.; wings, 6.7–7.5 mm.

Female: The front is entirely silvery. At its widest portion it is scarcely more than half as wide as the face just above the mouthparts. Front gradually narrowed, at the ocellar triangle it is about equal to the width of one ocellus. The coxæ are yellow and the apical subsegments of the tarsi lighter brown than in the males. The tarsal claws and pulvilli are very strongly developed especially on the front two pairs of legs, about equal in length to the last three subsegments of tarsus. Each subsegment of posterior tarsi is produced into a moderately strong spur-like projection at the apex above (Fig. 6a). The abdomen is rather clavate in shape, being widest at segments four to five. The sides of the abdomen are yellowish brown in ground color with the gray side spots as in the male. The gray markings of the fifth tergum are rather broadly joined on the hind margin and the sixth is all gray except for a small basal portion which is brown. Hind margin of sixth tergum not excised. Ovipositor base rather globose, swollen above and below. Base chiefly polished bright red, covered with white pubescence on the anterior portion. Piercer straight, yellow, about equal in length to its base and extending slightly beyond apex of the third abdominal segment (Fig. 6c). *Length:* Body, 5.0 mm.; wings, 6.0 mm.

Holotype male: Barro Colorado, Canal Zone, Panama, July 17, 1924 (N. Banks). Allotype female: Ancon, Canal Zone, Aug. 6, 1924 (N. Banks). One paratype male, same locality and collector as type, July 16, 1924.

Type (M.C.Z. No. 27704) and allotype returned to the Museum of Comparative Zoölogy. Paratype retained temporarily in the Iowa State College collection, to be later deposited in the U. S. National Museum.

Tömösváryella tuberculata n. sp.

(Figs. 7a-d)

This species is related to *T. sachtlebeni* (Aczel). It differs by having a strong tubercle on each of the hind femora, by having the projection on the hind trochanters more broad and rounding at the apex, by having the abdomen more polished and sparsely haired and the harpagones more broad and curved on outer edges.

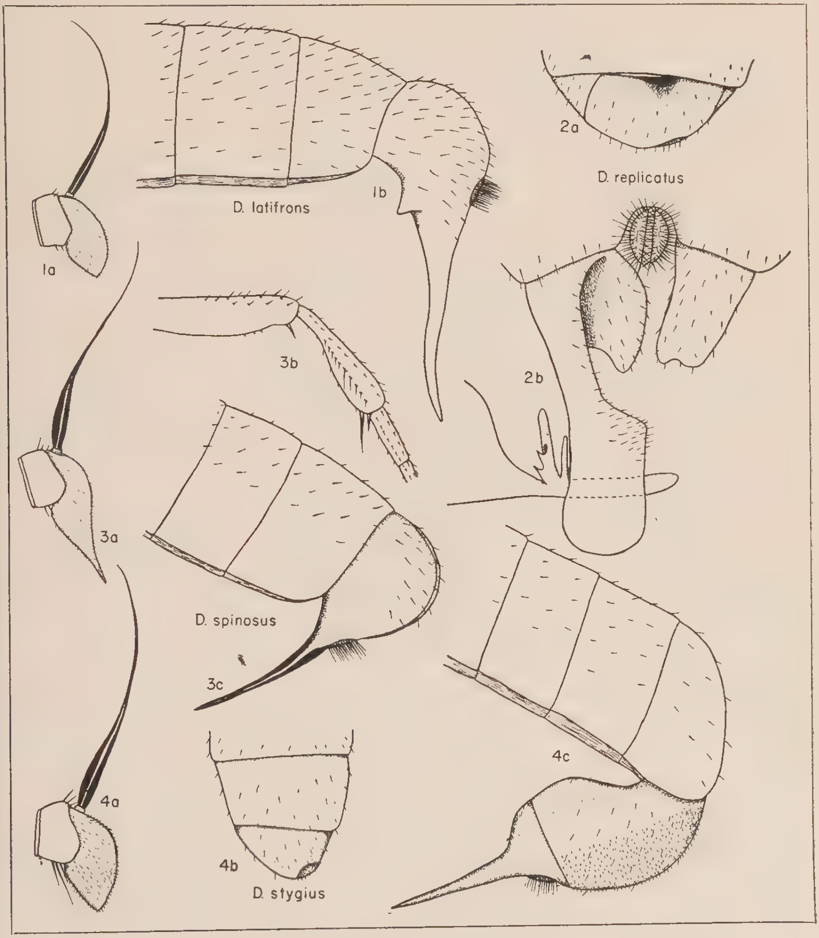
Male. Head: Junction of the eyes about equal to the length of the upper portion of the front. Upper portion of front shining black, lower part and face gray pubescent. Occiput gray on sides and below, subshining black above. Mouthparts and antennæ brownish yellow, third antennal segment rather long acuminate below (Fig. 7c). *Thorax:* Chiefly shining black in ground color, very lightly brownish pollinose on the dorsum, scutellum polished black. Humeri and halteres yellow, tegulæ black. Dorsocentral hairs very fine, scutellum almost bare. *Legs:* Chiefly black, apices of femora, broad apices and bases of tibiæ and the first four subsegments of tarsi yellow. Hind trochanters each with a large rounded projection at apex below. Each hind femur with a strong tubercle near base below (Fig. 7a). Femora moderately slender, first two pairs with flexor spines, hind pair with flexor bristles. Tarsal claws and pulvilli small, about as long as the last subsegment of tarsus. *Wings:* Hyaline, without a perceptible tinge of brownish. Third costal section just one-half as long as the fourth, the two combined are about one-half as long as the fifth section. Crossvein r-m situated slightly before the middle of the discal cell and last section of fourth vein very slightly curved, almost straight. *Abdomen:* Metallic black, very lightly dusted with gray. Sides slightly rounding, widest at about segments three to four. First tergum with a fan of five or six long dark bristles on each side, abdomen otherwise almost devoid of conspicuous hairs. Seventh tergum slightly visible from dorsal view. *Hypopygium:* About three-fourths as long as the fifth abdominal segment, with a large apical membranous area, which extends through the middle to the base on the dorsum (Fig. 7d). Hypopygium microscopically gray pubescent. From a ventral view the coxopodite is elongate, slightly longer than the sclerotized portion of the eighth segment on the right side. The harpagones are broad and curved, cupped out on the inner surfaces and pointed at inner apices (Fig. 7b). The inner harpago is the larger of the two. *Length:* Body and wings, 2.8 mm. Female unknown.

Holotype male: Soledad near Cienfuegos, Cuba, Aug. 6–20 (N. Banks). One paratype male, same data at type.

Type (M.C.Z. No. 27705) returned to the Museum of Comparative Zoölogy. The paratype has been deposited in the U. S. National Museum.

EXPLANATION OF PLATE 1

Fig. 1. *Dorilas latifrons* n. sp.
  a. Antenna.
  b. Female abdomen, lateral.
Fig. 2. *D. replicatus* n. sp.
  a. Male hypopygium, dorsal.
  b. Ventral of male harpagones and tip of sixth abdominal segment.
Fig. 3. *D. spinosus* n. sp.
  a. Antenna.
  b. Front leg of female.
  c. Female abdomen, lateral.
Fig. 4. *D. stygius* n. sp.
  a. Antenna.
  b. Male hypopygium, dorsal.
  c. Female abdomen, lateral.



HARDY—NEOTROPICAL DORILAIDAE

EXPLANATION OF PLATE 2

Fig. 5. *D. trinidadensis* n. sp.
  a. Antenna.
  b. Male hypopygium, dorsal.
  c. Male hypopygium, right side.
Fig. 6. *Cephalosphæra panamænsis* n. sp.
  a. Hind tarsus, female.
  b. Antenna.
  c. Female abdomen, lateral.
  d. Male hypopygium, dorsal.
Fig. 7. *Tömösváryella tuberculata* n. sp.
  a. Hind trochanter and femur, male.
  b. Male hypopygium, ventral.
  c. Antenna.
  d. Male hypopygium, dorsal.

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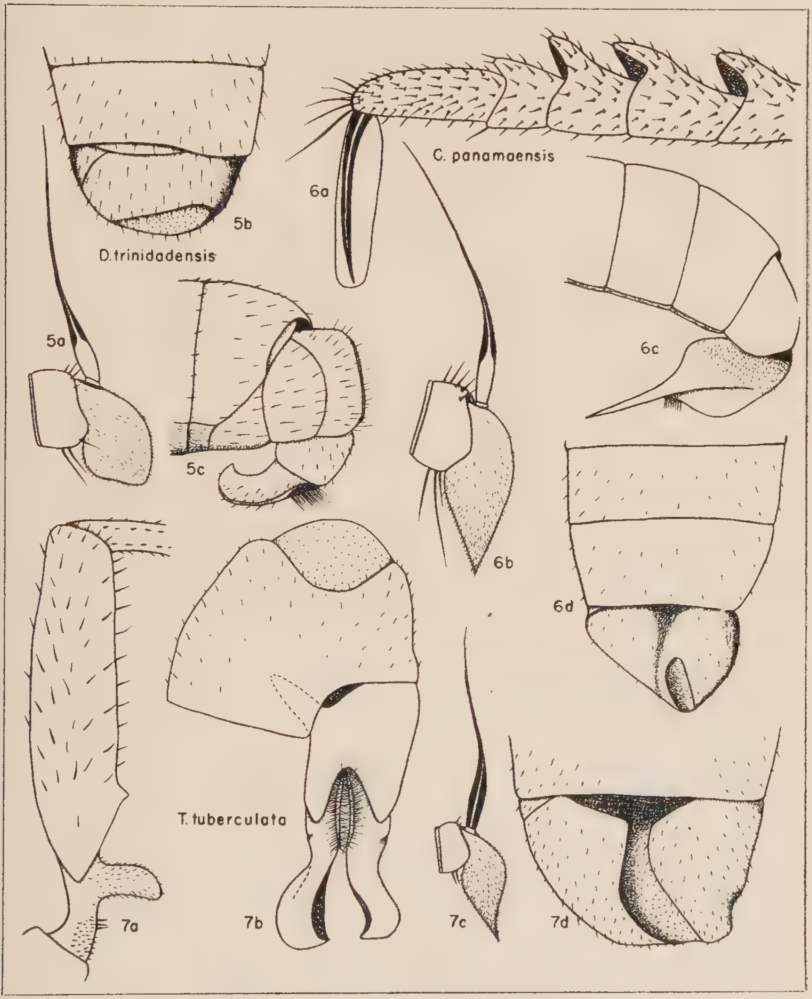


HARDY—NEOTROPICAL DORILAIDAE

NEW AND LITTLE KNOWN SPECIES OF NEARCTIC TRICHOPTERA

By D. G. Denning

University of Wyoming, Laramie, Wyoming

Examination of additional caddis fly material from western United States has resulted in the recognition of several new and little known species. Descriptions of five of the new species appear in this paper. Unless otherwise stated the types of the new species are in the writers collection at the University of Wyoming. I would like to express my thanks to Dr. L. J. Milne who made available one of his holotypes for comparison with a species illustrated herein.

Leptocella aeolius n. sp.

This is an interesting species which can readily be differentiated from other described Nearctic Leptocella by the fuscous colored wings. The clasper and tenth tergite are also markedly different from other described species. This species was collected from a clear, cold, rapidly flowing mountain stream at approximately 7,500 feet elevation.

Male.—Forewing length 10 mm. General color of forewings and hindwings reddish brown, considerably brighter toward apex, a series of transverse whitish spots from stigma to apex, fringe along margin near tip of anal veins reddish brown, fringe at apex of hind wing reddish brown.

Genitalia as in fig. 1. Ninth segment with dorsum produced caudad as a concave dorsal hood, below which arises a pair of long finger-like processes; lateral margin produced caudad as a triangular side piece. Tenth tergite practically ventrad in position, wide basally, gradually acuminate, slightly upturned distally, apices narrowly incised for a short distance, fig. 1A; pair of curved filaments which arise near base of tergite expanded at apex into a slightly convex plate. Clasper with basal flap narrow, irregular in outline, neck narrow; mesal lobe subacute from lateral aspect, spatulate from dorsal or ventral aspect; lateral apical lobe very irregular and bearing several long stout setae. Between base of claspers arise a pair of filamentous lobes bearing at apex two long slender setae. Ædeagus semi-membranous with characteristic spoonlike ventral plate.

Holotype. Male.—Sybille River, near Wheatland, Wyoming, June 19, 1947 (D. G. Denning).

Athripsodes pfadti n. sp.

This species is very similar to *arielles* Denning, but differs from it in details of the tenth tergite, such as the clusters of minute spines along the lateral surface, in the wide sclerotized lobe of the clasper, and the presence of two large internal spines in the aedeagus.

Male.—Length 8–9 mm. Eyes small, separated on dorsum by about five times the dorsal width of one eye. Antennæ rather short, about one and one-third times the length of the forewing; basal portion of each segment white, gradually becoming uniformly brownish. Wings light brown, a prominent white spot at tip of anal veins, a fringe of white hairs along margin, extending from R to M_3. Legs a lighter shade than wings.

Genitalia as in fig. 2. Ninth segment with base wide, considerably narrowed toward center; articulation with cerci quite indistinct. Cerci, from dorsal aspect, subtriangular, apices separated by a wide triangular incision, a few long fine setæ present. Tenth tergite reaching caudad slightly beyond cerci, apex upturned; viewed from dorsal aspect apical margin straight; lateral surface with two clusters of minute spines, one nearly circular group of six, and one group of three. Clasper with basal portion projected caudad a short distance which appears as a prominant sub-triangular point when viewed from the caudal aspect, fig. 2A; apical segment semi-membranous, digitate, bearing a scattering of rather stout setæ; sclerotized lobe shorter than apical segment, considerably expanded apically, margin rounded when viewed laterally; somewhat hammer-shaped from caudal view, fig. 2A, a pair of small setæ along margin; caudal surface of basal portion bears several large and small setæ. Ædeagus with apical portion semi-membranous, trilobed from lateral view, two prominant spines internally, fig. 2B.

Female.—Length 6.5–8 mm. Very similar in general characteristics to male. Genitalia as in fig. 2C.

Holotype. Male.—Albany County, Wyoming, Little Laramie River, August 1, 1947 (R. E. Pfadt).

Allotype. Female.—Same data as for holotype.

Paratypes.—17 males, 21 females, same data as for holotype.

Ecclisomyia maculosa Banks

Originally described from Colorado; very little is known of the distribution of this characteristically western species.

Male.—Length 9 mm. Wings light brown, rather conspicuously irrorate with white markings. Legs a trifle lighter brown than wings, spines black, spurs luteous. Genitalia as in fig. 3 and 3A.

Female.—Genitalia as in fig. 3B. General characteristics very similar to male. Cercus, from lateral aspect, short and stocky, apex blunt; from dorsal aspect V-shaped incision extends nearly to base; cerci form a tubular structure with basal portion fused to dorsal portion of tenth segment. Dorsal portion of tenth segment very thin, spatulate, deeply incised, lateral portion also very thin and extending to subgenital plate. Subgenital plate seen from ventral aspect truncate, short and wide, reaching caudad almost to distal margin of dorsal portion of tenth segment.

This species was collected at an elevation of approximately 10,700 feet, along a shallow, narrow swift flowing mountain stream. The majority of the specimens collected were found resting on the banks of the stream, often only an inch or so above the water.

Wyoming: Albany County, Snowy Range Mountains, July 26, 1947 (D. G. Denning); 19 males, 3 females.

Limnephilus utahensis n. sp.

This species is closely related to *occidentalis* Banks and *labus* Ross. It can easily be differentiated from these species by the short stocky tenth tergite, the shape of the cerci and claspers and the presence of 3 subapical spines on the lateral arm of the ædeagus.

Male.—Length 14–15 mm. Forewings tawny except for irregular dark brown markings along the veins and a concentration of irregular dark brown markings from the cubitus to the inner margin of the wing. Front femur with a linear patch of black spinules along under side and with 2 small apical spines; front basitarsus subequal to following segment; front tibia with 8 to 10 black spines including one apical pair. Eighth tergite with mesal projection covered with black spinules.

Genitalia as in fig. 4. Ninth segment with lateral portion wide, markedly reduced to a narrow bridge dorsally, portion next to cerci arcuate. Lobes of tenth tergite very short and stocky, apex small and only slightly upturned. Cerci, from lateral view, only a trifle longer than wide, posterior margin slightly sinuate; convergent from dorsal view and with an acute apex; viewed from caudal aspect, fig. 4A, mesal margin black and sharply bent mesad. Claspers longer than wide, sides practically parallel, dorsal and ventral corners rounded, a small acute projection along distal margin. Lateral arms of ædeagus fig. 4B, shorter than main body, apically enlarged into a lobe bearing a brush of fine setæ, apex acute, just caudad to apex occur three small spines as in fig. 4B. Apparently some modification of these subapical spines may occur, as on one lateral arm of the paratype the most ventrad spine is considerably elongated, fig. 4C.

Female.—Length 16 mm. Genitalia as in fig. 4D. Same color and general structure as male. Ninth segment completely divided dorsally. Tenth tergite tubular, apex attenuated, bifid from dorsal view, fig. 4E.

Holotype. Male.—Callao, Juab County, Utah, August 7, 1945 (G. F. Knowlton), at light. [U. S. National Museum Collection.]

Allotype. Female.—Same data as for holotype.

Paratype. Male. Same data as for holotype.

Holotype and allotype deposited in the U. S. National Museum.

Dr. G. F. Knowlton collected these specimens from a light trap operated near a small pond fed from an artesian well. Callao is located just southwest of the Great Salt Lake Desert.

Lepidostoma veleda n. sp.

This species belongs to the Pluvial group and bears closest resemblance to *ormea* Ross and *rayneri* Ross. It can be distinguished from these species by the lateral lobe of the tenth tergite which bears a dorsal and ventral spine opposite one another and the short truncate condition of the tenth tergite when seen from the dorsal aspect.

Male.—Length 7.5–8 mm. Basal segment of antenna long, almost equal to dorsal width of head, a scattering of black scales over most of segment, especially dense along mesal surface. Third segment of maxillary palpus with a very dense brush of long black scales. Costal cells of forewing reflexed nearly to media, resultant pocket lined with dense brown setæ and black scales which are especially heavy along margin, in a few individuals a scattering of black scales will be found extending beyond margin of pocket.

Genitalia as in fig. 5. Ninth segment annular, tergite produced into a triangular projection. Tenth tergite divided into a pair of divergent lateral lobes, separated on meson to base, from dorsal aspect, fig. 5A, short, truncate, prominent acute dorsal spine near center of margin; from lateral aspect, fig. 5, dorsal spine directed dorsad, in a straight line with the ventral spine which is curved slightly cephalad. Claspers long, narrow, convergent from ventral view, at base the short digitate process is gradually curved caudad, apex sub-acute with small acute caudad directed process near apex on mesal surface. Ædeagus long, tubular, base bulbous, apex of main portion submembranous and with a pair of long, slender, acute tubular processes along dorsal surface.

Female.—Length 8–8.5 mm. Similar to male except for sexual dimorphic characters. Ninth and tenth tergites, fig. 5B, relatively short; ninth tergite becomes a darkened sub-acute angulation at apex, the tenth tergite lobes divided and broadly rounded at apex. Spermatheca, fig.

5C, with ventral bridge well marked and crossing spermatheca near margin.

Holotype. Male.—Albany County, Wyoming, Snowy Range Mountains, near Centennial, Wyoming, August 3, 1947 (D. G. Denning).

Allotype. Female.—Same data as for holotype.

Paratypes.—5 males, 2 females; Woods Landing, Wyoming, August 10, 1947 (D. G. Denning). 3 males; Poudre River, 15 miles west of Teds Place, Colorado, August 17, 1947 (D. G. Denning). 3 males, 4 females; Poudre River, approximately 15 miles east of Cameron Pass, Colorado, August 19, 1947 (D. G. Denning). 10 males; Rocky Mountain National Park, Colorado, August 9, 1947 (D. G. Denning).

In all instances the species was collected only from clear, swift flowing mountain streams.

Lepidostoma ormea Ross

This recently described species was previously known only from a male collected in Utah.

Colorado: Illinois River, south of Walden; August 10, 1947 (D. G. Denning), 1 male.

Collected from a shallow, clear swift flowing stream at approximately 8,000 feet elevation.

Rhyacophila mirus n. sp.

This species is very closely related to *alberta* Banks.

Male.—Length 11–12 mm. Color brownish yellow, with a scattering of dark brown markings over most of forewing. First and second pair of legs light brown except for a light yellowish color over apical portion of tibia, third pair of legs luteous. Sternum of sixth and seventh segment with a short acute mesal projection.

Genitalia as in fig. 6. Ninth segment with a wide emargination laterally resulting in the ventral half being greatly narrowed. Tenth tergite declivous from lateral view, reaching ventrad to margin of clasper; from dorsal aspect, fig. 6A, slender, practically same width throughout, apical portion produced into a pair of thin plates, the inner pair (best viewed from lateral aspect) slender and rounded distally, the outer pair convex, wide and distally nearly truncate. Basal segment of clasper long, almost two and one-half times as long as wide, margins nearly parallel; apical segment about one-half as long, the ventral margin attenuated as in fig. 6. Ædeagus long, reaching to caudal margin of basal segment of clasper, apical half of exposed portion slender, tubular, apex bifid; lateral arms from ventral aspect, fig. 6B, reaching caudad one-third length of apical segment of clasper, apices gradually convergent, near middle of lateral arms area is expanded, its ventral surface bearing a number of minute spicules and its margin bearing a series of seven flat setæ.

Female.—Length 12 mm. Same general color and characteristics as for male. Sixth sternum with an acute mesal projection. Eighth sternum with a wide mesal projection. Genitalia simple, tubular and tapering from base to apex.

Holotype. Male.—Albany County, Wyoming, Snowy Range Mountains, outlet of Mill Pond; September 25, 1947 (D. G. Denning).

Allotype. Female.—Same data as for holotype.

Paratypes. Same data as for holotype, except August 31, 1947, 2 males.

All specimens collected from a clear, cold, swift-flowing mountain stream at approximately 10,500 feet elevation.

Rhyacophila verrula Milne

The collecting of this species in southeastern Wyoming constitutes a considerable extension to its previously known range of British Columbia, Alberta, Oregon and Washington. Male genitalia, fig. 7, drawn from a specimen compared to holotype.

Wyoming: Snowy Range Mountains, outlet of Lake Marie; August 31, 1947 (D. G. Denning), 3 males, 1 female. Collected along a rapid mountain stream at 10,500 feet elevation. Albany County, Snowy Range Mountains, outlet of Mill Pond; September 25, 1947 (D. G. Denning), 1 male. Collected along a rapid mountain stream at 10,500 feet elevation. Albany County, Snowy Range Mountains, Nash Fork Creek; September 25, 1947 (D. G.

Denning), 3 males. Collected along a rapid mountain stream at 9,600 feet elevation.

Polycentropus halidus Milne

This species has not been recorded since it was described in 1936 by Milne from New Mexico. The determination of the specimen used in the illustration, fig. 8, was checked by Ross.

California: Morgan Hill; September 5, 1939 (C. E. Mickel), at light, 2 males, 1 female.

Arizona: Oak Creek Canyon, Banjo Bill Forest Camp; June, 1942 (C. P. Alexander), 2 males.

Polycentropus variegatus (Banks)

Very little is known regarding the distribution of this species previously recorded from Washington and British Columbia. The collecting of the species in southeastern Wyoming is a very interesting extension in its known range. Male genitalia as in fig. 9.

British Columbia: Cowichan Lake, August 1940 (C. P. Idyll), 2 males.

Wyoming: Pole Mountain, near Laramie; August 16, 1947 (D. G. Denning), 1 male. Collected along a clear, shallow mountain stream at approximately 7,500 feet elevation.

California: Lake Tahoe; August 20, 1916 (L. Bruner), 1 male, 1 female.

EXPLANATION OF PLATE 3

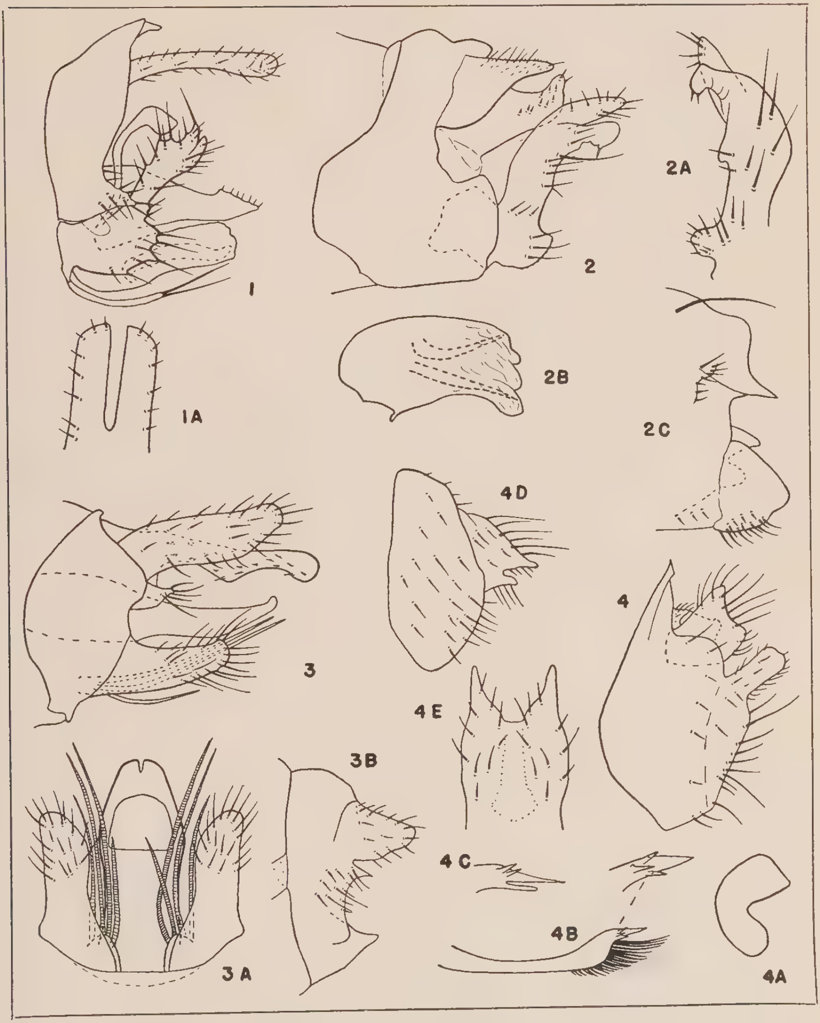
Fig. 1. *Leptocella æolius*, lateral aspect; 1A, tenth tergite, ventral aspect.

Fig. 2. *Athripsodes pfadti*, lateral aspect; 2A, clasper, caudal aspect; 2B, ædeagus, lateral aspect; 2C, lateral aspect of female.

Fig. 3. *Ecclisomyia maculosa* lateral aspect; 3A, ventral aspect; 3B, lateral aspect of female.

Fig. 4. *Limnephilus utahensis*, lateral aspect; 4A, margin of claspers, caudal aspect; 4B, lateral arm of ædeagus; 4C, apex of lateral arm of ædeagus of paratype; 4D, lateral aspect of female; 4E, dorsal aspect of tenth tergite of female.

Psyche, 1948 Vol. 55, Plate 3

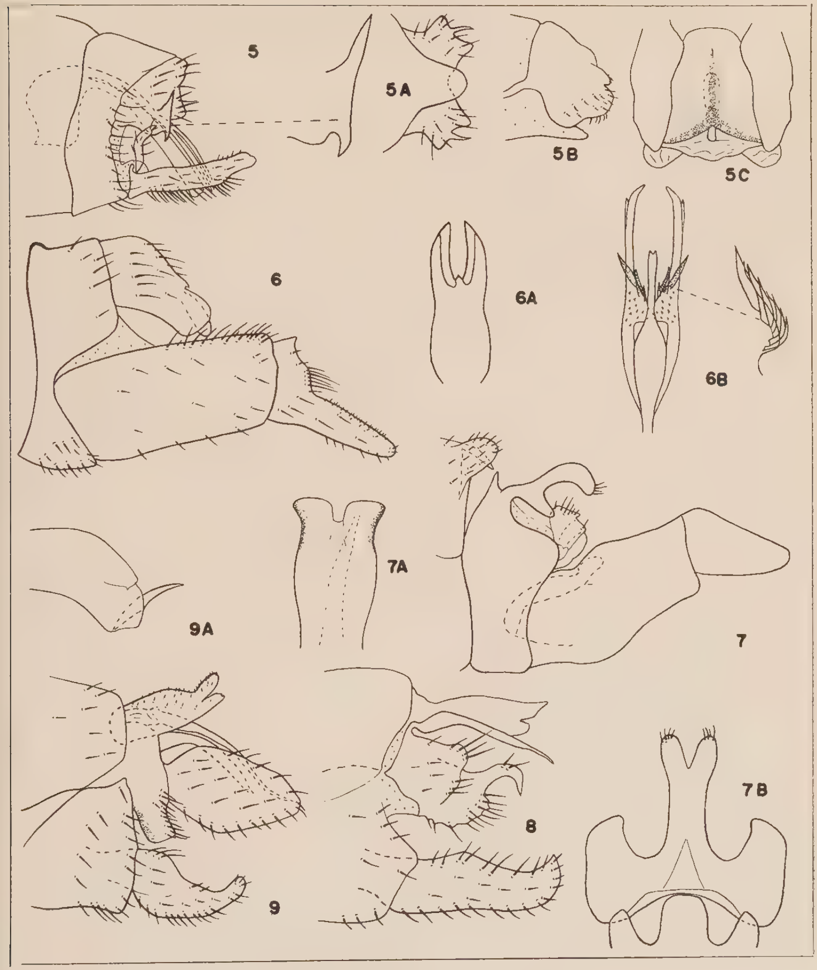


Denning—Nearctic Trichoptera

Explanation of Plate 4

Fig. 5. *Lepidostoma veleda,* lateral aspect; 5A, dorsal aspect of tenth tergite; 5B, lateral aspect of female; 5C, spermatheca.
Fig. 6. *Rhyacophila mirus,* lateral aspect; 6A, dorsal aspect of tenth tergite; 6B, ventral aspect of ædeagus and lateral arms.
Fig. 7. *Rhyacophila verrula,* lateral aspect; 7A, sheath of ædeagus from ventral aspect; 7B, dorsal aspect of ninth and tenth tergites.
Fig. 8. *Polycentropus halidus,* lateral aspect.
Fig. 9. *Polycentropus variegatus,* lateral aspect; 9A, lateral aspect of ædeagus.

PSYCHE, 1948 VOL. 55, PLATE 4



DENNING—NEARCTIC TRICHOPTERA

NOTES ON CHINESE PANORPIDÆ (MECOPTERA)[1]

By F. M. Carpenter
Harvard University

Panorpa diceras was described by McLachlan in 1894 from Szechuan, China. Lack of knowledge of the genital structures of the male type, which has been in private hands and inaccessible for many years, has prevented recognition of the species, though both Dr. Tjeder and I attempted it. Acquisition of the McLachlan collection by the British Museum (Natural History) in 1938 has finally made the type available for study, and in reply to my request for information about it, Mr. D. E. Kimmins very kindly sent me two drawings, which enable recognition of the insect. Since it is now apparent that both Dr. Tjeder and I have misidentified *diceras,* I include here an account of its structure and of the taxonomic changes involved.

Panorpa diceras McL. (Fig. 1)

Panorpa diceras McLachlan, 1894, Ann. Mag. Nat. Hist., 13: 423 (*nec P. diceras* Tjeder, 1935, Arkiv för Zoologi, 27A(33): 7; *nec P. diceras* Carpenter, 1938, Proc. Ent. Soc. Wash., 40: 270).

Panorpa grahami Carpenter, 1938, Proc. Ent. Soc. Wash., 40: 272, figs. 5, 9.

The drawings of the genital bulb of the type sent by Mr. Kimmins are reproduced in the accompanying figure. A comparison of these with Dr. Tjeder's illustrations of his species, and with my drawings (1938) of the supposed *diceras* reveals obvious differences, especially in the form of the hypovalvæ and ventral valves. On the other hand, comparison with my figures of the genitalia of *grahami* leaves no doubt of the identity of this species with *diceras.* In other details of body structure, as well as wing coloring, *grahami* also agrees with Mc-

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[1] Published with a grant from the Museum of Comparative Zoology at Harvard College.

Lachlan's account of *diceras*. It is significant that the type of *grahami* was collected only a few miles from Tachienlu, the type locality of *diceras*. My failure in 1938 to recognize the specimen of *grahami* as *diceras* was due to an incorrect interpretation of McLachlan's description of the hypovalvæ.

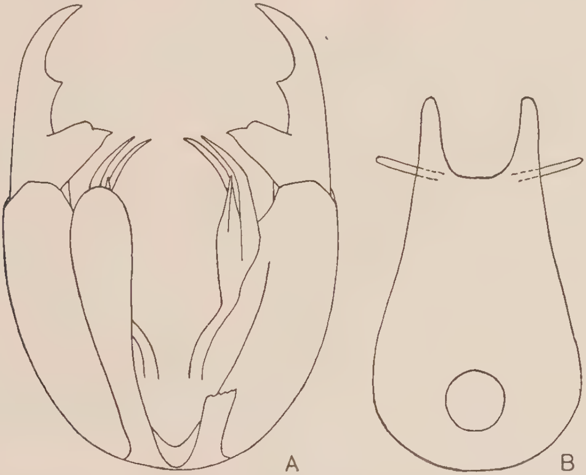

Fig. 1. *Panorpa diceras* McLachlan. A, ventral view of ♂ genital bulb, drawn from type in the British Museum (Natural History) by D. E. Kimmins. B, preëpiproct of same specimen.

I have already (1938, p. 271) proposed a new name (*tjederi*) for the species which Tjeder identified and described as *diceras*. The following is a description of the species which I originally identified as *diceras*:

Panorpa kimminsi, n. sp.

Panorpa diceras Carpenter, 1938, Proc. Ent. Soc. Wash., 40: 270, fig. 2, 10, 11 (*nec P. diceras* McLachlan, 1894).

The genital bulb of the male and the internal skeleton of the genital segment of the female have already been described and figured in the paper mentioned above, so I add here only an account of the rest of the body and the wings: Body yellow, with black in the region of the ocelli and between the antennal bases; also, a black stripe along each side of the rostrum; eyes gray-brown; thorax and abdomen yellow, with a black stripe laterally, sixth abdominal segment of male with a pair of short posterior horns, as in *diceras*. Fore wing: length 15–18 mm.; width, 4 mm.; wing membrane dusky hyaline, with greyish yellow at apex; pterostigma yellow.

Holotype (♂): Omei (11,000 ft.), Szechuan, China, July, 1936 (D. C. Graham); in the U. S. National Museum. This is the specimen which I illustrated under the name *diceras* McL. in 1938, figures 2 and 10.

Allotype (♀): near Tachienlu (5000–8500 ft.), Szechuan, China, June 18–July 12, 1923 (D. C. Graham); in U. S. National Museum. This specimen was illustrated in the same paper (1938), figure 11.

Paratypes: 1 ♂, Suifu, Szechuan, China, Oct. 1, 1929 (D. C. Graham); in U. S. National Museum. 1 ♀, west of Yachow (2000-7500 ft.), Szechuan, China, June 14–18, 1922 (D. C. Graham); in U. S. National Museum. 1 ♂, same collection data as last, in Museum of Comparative Zoölogy. 1 ♀, same collection data as allotype, in U. S. National Museum. 2 ♀, 9 miles southwest of Tachienlu (9000–11,000 ft.) Szechuan, China, June 25–27, 1923; in Museum of Comparative Zoölogy.

There is an additional female, in poor condition and not designated a paratype, from 30 miles north of Tachienlu, Szechuan, 12,000 ft., July 5–9, 1923 (D. C. Graham).

This species, which I have named for Mr. D. E. Kimmins of the British Museum (Natural History), belongs to the *diceras* group of *Panorpa*, but differs from the other species included there by the curved forceps and peculiar configuration of the ventral valves of the male.

NOTES ON *MELANOPHORA RORALIS* (LINN.) (DIPTERA)

By Frank Morton Jones
Wilmington, Delaware

In 1903 Professor C. T. Brues published (Entomological News, vol. 14, p. 291) an interesting account of his discovery, made at Woods Hole, Massachusetts, that the larva of the Dexid fly, *Melanophora roralis* (Linn.), is an internal parasite of "sow-bugs" (Oniscidæ, *Porcellio* sp.), pupating within the body-cavity of its deceased host.

Meager European references had indicated the possibility of a wider range of larval habits for this insect; but in 1934 the careful work of W. R. Thompson (Parasitology, vol. 26, pp. 378–448, pls. 15–22) demonstrated that *roralis* (with related species) occurs regularly as a parasite of the Oniscidæ, and his taxonomic studies of larva, puparium and adult placed *roralis* on a firm basis for future recognition. Of this species his material was not abundant, and his few field-records related to European conditions.

The following observations on *roralis* were made at Vineyard Haven, Marthas Vineyard Island, Massachusetts, hence only a few miles from the place of Professor Brues' discovery of 1903. In the summer of 1946 I was conducting a series of experiments with various chemicals to which insect-attractant qualities had been attributed. In some of these tests the selected chemical was dropped upon a plaster-of-Paris disc substituted for the usual bait-receptacle in a Rummel-type trap. On August 28, as I uncorked a small vial for rebaiting one of these traps with isoamyl salicylate, a small black-winged fly circled about the rim of the uncorked vial; and in the nine days terminating on that date, forty-one flies of that same species had appeared in the trap thus baited, along with only three flies of other species. No comparable response to other baits was noted, in the three similar and adjacent traps operated through this period. These results seemed indicative that isoamyl salicylate possesses a strong selective attraction for this one fly, *Melanophora roralis* (Linn.); but the termination of the experiments then prevented further confirmatory observations.

With the later-acquired knowledge of the identity of the insect and after reference to Professor Brues' account of its parasitic status, it seemed desirable to give *roralis* closer attention through the succeeding summer. However, that endeavor encountered unexpected difficulties, for not only was 1947 generally recognized as a year of unusual insect scarcity, but in May and June of that year 2700 acres of Marthas Vineyard, including the area under observation, had been sprayed from the air with DDT, and the oniscid host of *roralis* was not present in numbers approaching those of the preceding year. Only by persistent search and daily observation did some features of the economy of the insect become apparent.

Upon my arrival on Marthas Vineyard, June 22, *roralis* was promptly detected as a ''window-pane'' fly. Thereafter, through the summer, five bait-traps yielded one hundred and six examples of *roralis;* many others were recorded from the windows, screens and walls of the house, indoors and out. These adults occurred over two well-defined periods—the first extending from (at least) late June to mid-July, then after nearly a month's interval (actually by August 10) the flies commenced to appear again and were present throughout the remainder of the month and as late as September 5, when opportunity for observation terminated. These dates seem to indicate that in New England *roralis* has at least two annual broods. In England (Thompson) the winter is passed as second-stage larvæ and no summer brood appears.

Search for the early stages of *roralis* was continued throughout the summer, more successfully under the loose bark of fallen trees, where sowbugs often congregate. In early July a few empty and broken puparia, each partly enclosed in the dry fragments of a sowbug, were found. On July 23 two living larvæ and one puparium were found, each in a body of a recently deceased sowbug. Meanwhile, twenty-five apparently healthy adult sowbugs had been installed in a gallon jar, with layers of bark for shelter and concealment, and pieces of apple and of potato for food. On August 10 this jar was found to contain 18 living sowbugs, fragments of 7 others, and 3 living puparia of *roralis;* on August 21, only 13 living sowbugs remained, and no additional *roralis.* That is, at least 12% parasitism was indicated and a much larger fatality through cannibalism, a recognized sowbug trait. Examination of the 13 survivors showed that among these, two species were represented—*Oniscus asellus* Linn. and *Porcellio scaber* Latr.; and the fragments enclosing *roralis* puparia indicated that both these species had served as hosts. Emergences of *roralis* adults (four) took place on August 11 and August 15.

Adult *roralis* is diurnal in habit, rarely appearing among the overnight captures of the bait-traps, and only once in a light-trap operated throughout the season.

Further experiments with chemical baits (conducted in collaboration with Mr. Charles P. Kimball of Rochester, New York) forced some modification of the belief that isoamyl salicylate possesses a unique attraction for *roralis,* for in 1947 traps baited with other chemicals sometimes captured fully as many flies of this species, and it became a question whether the entrance of the flies into the traps, in part at least, might not be ascribed to their habit of penetrating and exploring narrow crevices and cavities, rather than a response to attractive odors. A few experiments with an unbaited trap tended to confirm that suspicion.

The almost uncanny ability of *roralis* to gain entrance to screened houses may be attributed to this habit. Indoors, these flies do not usually evince strong attraction toward food, and their lives are apparently short, for their dead bodies occur commonly on window-sills, in cobwebs, and not rarely in bathtubs or in bowls of washstands where perhaps the presence of moisture attracts them.

Long ago it was suggested (W. D. Pierce, 1907, U. S. Bull. Ent. 64, pp. 15 and 22) that sowbugs, because of their unsavory habitats and scavenger habits, might be concerned in the transmission of disease. From most modern dwellings the sowbug is usually excluded; but *roralis*, its intimate associate, passes all ordinary barriers and may penetrate to all the rooms of human dwellings. Should the suspicion against the sowbug be substantiated, then *roralis* too may be recognized as a potential source of danger.

Theodore Dru Addison Cockerell

THEODORE DRU ADDISON COCKERELL

As this issue of Psyche goes to press, we have received notice of the death of Professor T. D. A. Cockerell on January 26, 1948. The following sketch of his life is presented as a tribute and in recognition of his entomological contributions. The accompanying photograph was kindly sent by Dr. Norma LeVeque.

Born in Norwood, England, in 1866, Professor Cockerell came to this country at the age of twenty-one and for the last forty-four years of his life was on the faculty of the University of Colorado. He made many collecting trips, even to such remote places as India, Australia, Peru, Siberia, and South Africa. His interests in natural history were very broad and his publications, which number over three thousand, include contributions to botany, paleontology, and zoology. Insects, of course, were his main interest. His early investigations were on Lepidoptera, scale insects and Hymenoptera. If he had a specialty, it was the taxonomy of the wild bees. While at the University of Colorado, he worked extensively on insects in the Florissant Shales, which were not far from Boulder. He also published many papers on fossil insects in the Green River Shales, the ironstone nodules of Illinois, the coal beds of Maryland, the Baltic amber, and several other deposits. He was a regular contributor to Psyche. His first paper in this journal, on Jamaican butterflies, appeared in 1893 (vol. 6); the last, on African bees, in 1946.

Professor Cockerell was an inspiring teacher. His wide knowledge and boundless enthusiasm attracted students to the University of Colorado from remote parts of the country. That many of these have become outstanding zoologists and entomologists is due in large measure to the unique abilities of their teacher.

The Editorial Board.

ACCIDENTAL PARASITISM OF A TICK BY A TICK

By George Anastos
Biological Laboratories, Harvard University

A case of a tick feeding on another tick was recently observed amongst a lot of several thousand ticks taken off domestic animals in the Netherlands East Indies, and sent for study by Dr. F. C. Kraneveld of the Bacterioloog Veeartsenijkundig Instituut, Buitenzorg, Java. A partially engorged female *Rhipicephalus hæmaphysaloides paulopunctatus* Neumann had its hypostome deeply inserted in the ventral surface of the abdomen of a fully engorged female *Boöphilus microplus* (Canestrini). The vial containing these two specimens listed the host as a cow from Batavia, Java; so it would appear that the *Boöphilus* was attached and feeding on the cow at the time it was collected.

This should be considered a case of accidental parasitism. It cannot well be called ''cannibalism'' since it involves ticks not only of different species but even of different genera. The cases called ''cannibalism'' by previous authors concerned individuals of the same species only.

A survey of the literature has revealed the following cases known as ''cannibalism'': C. A. Barber (1895, Nature 52, p. 199) figures a male *Amblyomma variegatum* (*Hyalomma venustum*) attached to the posterior end of a female of the same species. Hunter and Hooker (1907, Bur. Ent. Bull. 72, p. 35) reported finding in a lot of live ticks from southwest Texas a female cattle tick, *Boöphilus annulatus,* with its mouthparts inserted in another tick (sex not given). Hooker, Bishopp, and Wood (1912, Bur. Ent. Bull. 106, p. 32) found amongst specimens sent to their laboratory a male *Boöphilus annulatus* (*Margaropus annulatus*) with its hypostome inserted into the side of an engorged female. Wood in two instances observed in the laboratory *Ornithodoros turicata* adults attaching and feeding on recently fed adults of the same species. Their final record was of two female *Dermacentor andersoni* (*Dermacentor venustus*) taken off a horse at Lakeside, Washington; when received in the laboratory the smaller female was attached to the more fully engorged one. Sergent (1930, Bull. Soc. Hist. Nat. Afr. du Nord XXI, p. 195) observed, in tick feeding experiments on a calf, that an unengorged nymph of *Hyalomma mauritanicum* attached itself to an engorged nymph of the same species. Roubaud and Colas-Belcour (1935, Ann. Parasit. Paris, T13 No. 5, p. 427) record two males of *Aponomma crassipes* on a female of the same species taken off a lizard in Tonkin, Indo-China. E. Francis (1938, Pub. Hlth. Rep., U. S. Pub. Hlth. Serv. 53, p. 2234) records a starved female *Ornithodoros turicata* attached and feeding on a fully engorged male, and an unfed fourth stage nymph feeding on a fed nymph of this same species. G. E. Davis (1941, Journal of Parasitology 27, p. 432) believes the term ''cannibalism'' to be a misnomer since the tick host is not consumed nor harmed enough to interfere with its normal functions. He records two cases wherein last stage nymphs of *Ornithodoros parkeri* were punctured by ticks which proceeded to completely engorge.

From the small number of known cases it would appear that ticks seldom feed on each other. Lack of a suitable host in nature might induce a tick to feed upon an already engorged tick; or else a tick might accidentally pierce another tick if the host were heavily infested.

A NEW *DISCOTHYREA* FROM NEW CALEDONIA (HYMENOPTERA: FORMICIDÆ)

By William L. Brown, Jr.

Biological Laboratories, Harvard University.

I have recently received a small collection of ants made by Charles L. Remington on New Caledonia during the spring of 1945. Among them is a single specimen of a new species of the interesting genus *Discothyrea* Roger. This genus, hitherto unrepresented on the island, belongs to a group of relict genera occurring in New Zealand, Australia, the East Indies and the warmer parts of the Americas. The find would seem to further strengthen the belief in the Australia–New Caledonia–New Zealand land-connections hypothesized as existing in the past, and would also further indicate a past contact between these areas and South America.

Discothyrea remingtoni new species

Worker. Total length measured from anterior clypeal border of the extended head to the posteriormost point on the curved surface of gastric segment II, 2.6 mm. Length of head alone, 0.80 mm.; Weber's length of thorax 0.73 mm.; length of petiole, 0.19 mm.; of gaster, measured around the curve of the vault to the anteriorly directed last segmental apex, 1.24 mm.

Head from the front broadly oval, cephalic index 88; broadest at about the posterior third of its length, with the sides somewhat converging and only slightly convex anteriorly; the posterior corners broadly rounded and passing easily into the evenly convex posterior border. Seen from the side, the posterior corners are evenly rounded. The structure of the frontal region and carinal plate much as in other *Discothyrea* species, the median ridge continuing upward to beyond the midlength of the head. Clypeus moderately projecting, broadly rounded anteriorly. A slight area above each antennal insertion on each side of the carinal plate very weakly impressed. Mandibles short, strong, convex, with knife-edged inner (masticatory) borders and acute apices. Antennal scapes massively clavate, their respective funiculi eight-jointed, the last joint exceptionally large and heavy. Eyes a little larger than most *Discothyrea,* with more than 12 and less than 18 ommatidia in each, situated just above the anterior quarter of the sides and a little toward the front or dorsal side of the head.

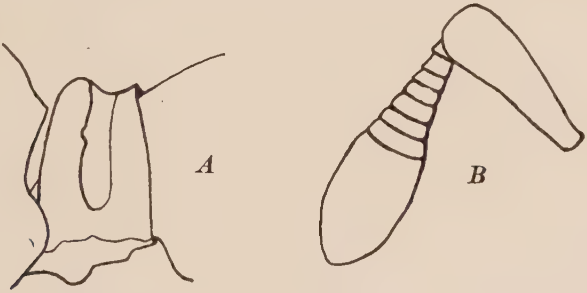

Fig. 1. *Discothyrea remingtoni* new species, worker. A, petiole and adjoining segments in profile; B, antenna.

Thorax not radically different from the usual run of *Discothyrea,* rather stout, with blunt, rounded humeral angles; epinotal teeth low and blunt, their bases extended down the sides of the epinotal declivity as low vertical lamellæ. The teeth are located somewhat farther down the epinotal declivity than in Emery's figures of *clavicornis* in the Genera Insectorum and in the original description of that species (1).

The petiole is in the form of a thickened disc divided, in at least the dorsal half, by a transverse sulcus into anterior and posterior low, rounded rims, the central planes of which are parallel to each other, the anterior being slightly the larger of the two. Seen from the rear, the profile gives the effect of a semicircle within a concentric semicircle, the anterior rim being the outer semicircle and the posterior the inner. The posterior rim is truncate at its highest point, thus providing a collar for the reception of the base of the first gastric segment. The sulcus which runs around the dorsum ends halfway down the sides of the node described; the median ventral keel is moderately prominent and bears a blunt process anteriorly. The gaster long, its second segment vaulted in the manner of most proceratiine ants and the undercurved apical segments directed anteriorly.

The integument in general clearly shining through the dense pilosity, very sparsely and finely punctulate. The impressed spaces on each side of the median facial ridge coarsely and closely punctate, scarcely shining. Clypeus, carinal fusion process and antennæ finely reticulate-punctate, subopaque to opaque.

The entire body clothed densely with short suberect to erect whitish hairs, which are slightly shorter on the head and antennæ, slightly more sparse on the legs.

Head ferrugineous yellow, the gaster, mandibles and antennæ somewhat lighter; thorax rich mahogany red, the petiole lighter; legs and tip of gaster medium yellow.

Holotype: One worker deposited in the Museum of Comparative Zoölogy, No. 27788. Labelled "7 mi. S.E. La Foa, New Caledonia, Rocky Humus. March 11, 1945 (C. L. Remington)."

The nearest species of the genus in size is *D. antarctica* Emery (2), which measures 2 mm., but *antarctica* is yellow throughout and has a differently shaped petiole. *D. globus* Forel and *D. clavicornis* Emery are much smaller and are described as having opaque integument; *globus* is red-brown throughout and *clavicornis* "flava"; both have differently shaped petioles. Mann (3) described specimens of *clavicornis* from the Solomons as "rich brownish red." Since Emery's type is a unique and possibly teneral, it would be best to wait for further collecting before formally differentiating Mann's specimens as a color race. Forel's var. *sauteri* of *globus* from Formosa should be accorded at least subspecific rank on the basis of the description (4).

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(4) Forel, A. Ent. Mitt. (1912) **1**: 47.

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